REMARKS/ARGUMENT

The drawings and specification have been amended in accordance with the Examiner's remarks.

Claims 1 and 6 were objected to because of the informalities listed on page 2, paragraphs 3 and 4 of the Office Action. These claims are amended in accordance with the Examiner's suggestions.

Claims 1-5 were rejected under 35 U.S.C. 102(e) as being anticipated by Seo et al.

Independent claim 1 has been amended to recite a method that among other limitations, which are neither disclosed nor suggested by Seo, comprises the steps of:

providing a thin, flexible heat curable adhesive film;

placing said thin flexible adhesive film on a thin semiconductor wafer;

preheating said thin flexible adhesive film to partially cure said thin flexible adhesive film, thereby obtaining adhesion between said thin flexible adhesive film and said semiconductor wafer,

simultaneously singulating both said thin flexible adhesive film and said wafer;

thereafter heating said one semiconductor die to fully cure said thin flexible adhesive film, thereby firmly adhering said die to said substrate.

The Seo reference shows a method of coating a liquid polyamide coating material (col. 4, line 4) on a wafer surface, which represents the Prior Art, as discussed on page 2, line 14-15 of Specification. This reference further has a step of fully curing the liquid polyamide coating material on the wafer surface (col. 4.lines 40-45), prior to singulation, and a further step of separating or singulating the wafer into a plurality of semiconductor chips (col. 4, lines 50-52).

Accordingly, Seo does not teach or suggest a step of "providing a thin flexible adhesive film" as recited in claim 1 of this invention. Note that a thin flexible adhesive film, as recited in claim 1, is necessarily a self supporting or solid film. In contrast, Seo discloses a non-flexible

deposited coating and is the Prior Art of the type over which the presently claimed invention is an improvement. (page 2, lines 14-15 of specification)

Furthermore, Seo does not teach or suggest a step of partially curing the applied film to obtain adhesion between the wafer and film. Finally, Seo does not teach or suggest a step of fully curing the film only after singulation of at least one individual die, with the film pressed against a substrate. All of these steps are now positively required in independent claim 1. In view of the above, withdrawal of this rejection is respectfully requested.

Claim 6 was rejected under 35 U.S.C. 103(a) as being unpatentable over Seo in view of Burns '642.

Claim 6 depends directly on claim 1 and includes all of the limitations found therein. Burns discloses that a carrier (28) is manufactured with "adhesive, such as B-staged epoxy, already coated on to the carrier 28." (Col. 9, lines 40-43) Furthermore, Burns suggests that separate adhesive patches are formed on the carrier by further skiving the adhesive coating of the carrier 28. (Col. 9, lines 50-53).

Thus, Burns does not suggest that a thin flexible adhesive film is applied to a wafer, as recited in claim 1. Furthermore, Burns, similarly to Seo, suggests a single curing step. Accordingly, Burns does not suggest that a flexible self-supporting film be first applied to the substrate, then pre-cured, and finally, after separating the wafer and the self-supported flexible into a multiplicity of chips, be fully cured, as required by claim 1. As a result, Burns does not remedy any of the deficiencies of Seo, as discussed in reference to claim 1.

Therefore, a combination cited by the Examiner cannot yield a method that would make the method as required by claim 1 obvious. This rejection should be withdrawn.

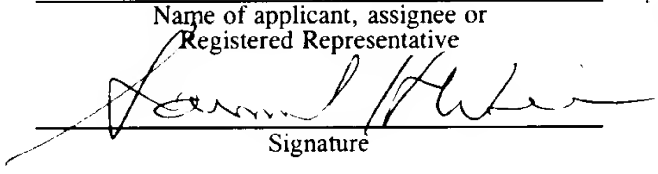
Claims 7 and 11 were rejected under 35 U.S.C. 103(a) as being unpatentable over Seo in view of Takiar '435. Claims 7 and 11 depend directly on claim 1 and include all of the limitations found therein. Therefore, any combination of cited references cannot make the claimed structure obvious because of the deficiencies of the Seo reference, as discussed in reference to claim 1. Accordingly, this rejection should be withdrawn.

New claim 12 is somewhat broader than the discussed above claim 1, but it still distinguishes from the cited prior art.

In view of the foregoing remarks, it is respectfully submitted that this case is now in condition of allowance and such action is respectfully requested.

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as First Class Mail in an envelope addressed to: Asst. Commissioner for Patents, Washington, D.C. 20231, on July 19, 2001

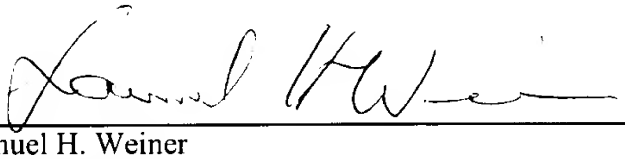
Samuel H. Weiner
Name of applicant, assignee or Registered Representative



Signature

July 19, 2001
Date of Signature

Respectfully submitted,



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APPENDIX B

VERSION WITH MARKINGS TO SHOW CHANGES MADE
37 C.F.R. § 1.121(b)(iii) AND (c)(ii)

SPECIFICATION:

Paragraph at page 3, line 20, to line 24:

Figure 3 and 4 show the die 10 of Figures 1 and 2 where a thin, flexible adhesive film 13 is used to bond the die 10 and substrate [11] 12. Film 13 is electrically conductive or may be insulative, and is heat curable. The use of such film is seen in Figures 2 and 4 to eliminate overspill, thus enabling a larger area die 10 on the substrate 11 of same area as that of Figures 1 and 2.

CLAIMS:

1.(Amended) [The] A process of connecting semiconductor die to a substrate having a top surface, [:]

said process comprising the steps of: providing [adhering] a thin, flexible, heat curable adhesive film which is [at least partially cured and is] of a first area [, to a this semiconductor wafer of a second area and which contains a plurality of laterally displaced, identical semiconductor die of respective third areas which are substantially less than the area of said first area;]

placing said thin flexible adhesive film on a thin semiconductor wafer of a second area, said semiconductor wafer being provided with a plurality of spaced apart semiconductor die, each of said semiconductor die having a respective third area which is substantially less than said first area;

preheating said semiconductor wafer and said thin flexible adhesive film to partially cure said thin flexible adhesive film, thereby forming adhesion between said thin flexible adhesive film and said semiconductor wafer;

thereafter simultaneously singulating both said [heat curable] thin flexible adhesive film and said plurality of identical semiconductor die to form individual elements [each being of the area of said die and a matching area of adhesive film adhered to one surface of said die];

thereafter applying at least one of said singulated die to the top surface of said substrate surface with the thin flexible adhesive film on said die, whereby the one singulated die with the partially cured adhesive film is pressed against said top surface and adhered thereto; and

thereafter heating the one semiconductor die to fully [curing] cure said thin flexible adhesive film to firmly adhere said die to said substrate.

6. (Amended) The process of Claim 1 which includes [the] a further step of adhering a second semiconductor die with a second thin flexible adhesive film thereon to said substrate at a position laterally removed from the first die.